

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

App. No. : 10/708,301 Confirmation No. 2300
Applicant : Akira Kuibira, et al.
Filed : February 23, 2004
T.C./A.U. : 3742
Examiner : Sang Yeop Paik
Docket No. : 39.034
Customer No. : 29453

Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY Under 37 C.F.R. § 1.111
Accompanying Request for Continued Examination
Under 37 C.F.R. § 1.114

Sir:

In response to the Office action, made final and mailed on May 31, 2006 in the above-identified patent application, Applicants have elected to file a Request for Continued Examination (RCE).

As a submission required by 37 C.F.R. § 1.114(a) and defined in § 1.114(c), the following amendment accompanies the present RCE. (The RCE and this amendment are being filed on October 31, 2006 along with a petition for a two-month extension of time, and are therefore timely filed.)

AMENDMENT Pursuant to 37 C.F.R. § 1.121

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks begin on page 6 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the present application.

Listing of Claims:

Claim 1 (currently amended): A holder for semiconductor as well as liquid-crystal manufacturing devices, the holder comprising:

 a ceramic susceptor of a ceramic whose thermal conductivity is 100 W/mK or more, said susceptor having a retaining side for retaining an object to be processed;

 a resistive heating element incorporated in said susceptor, said resistive heating element patterned in a circuit having a pattern spacing of 0.1 mm or more; and

 a metal plate having a thermal conductivity of 100 W/mK or more, said metal plate mechanically attached to said susceptor opposite said retaining side by an adhesive bonding layer, by screws screwed into said susceptor, or by a recess provided in said metal plate, into which said susceptor is snug-fit, for promoting diffusion of heat from said resistive heating element toward said retaining side.

Claim 2 (original): A holder as set forth in claim 1, wherein said metal plate and said ceramic susceptor are fastened by bonding, screws, snug-fitting, or vacuum adhesion.

Claim 3 (original): A holder as set forth in claim 1, wherein the resistive heating element is present beyond the middle in the thickness direction of said susceptor, toward the side opposite said retaining side.

Claim 4 (original): A holder as set forth in claim 1, wherein the ceramic of said ceramic susceptor is any one selected from Al_2O_3 , SiO_2 , B_4C and BN.

Claim 5 (cancelled)

Claim 6 (previously presented): A holder as set forth in claim 1, wherein the ceramic of said ceramic susceptor is any one selected from AlN, SiC and Si_3N_4 .

Claim 7 (cancelled)

Claim 8 (previously presented): A holder as set forth in claim 1, wherein said metal is any one selected from Al–SiC, Cu–W and Cu–Mo.

Claim 9 (original): A holder as set forth in claim 1, wherein the thickness of said metal plate is thicker than the thickness of said ceramic susceptor.

Claim 10 (original): A holder as set forth in claim 1, wherein the diameter of said ceramic susceptor is 200 mm or more.

Claim 11 (original): A holder as set forth in claim 1, wherein the porosity of the ceramic of said ceramic susceptor is 0.03% or less.

Claim 12 (previously presented): A holder as set forth in claim 1, wherein said retaining side has a warpage of 500 μm or less.

Claim 13 (original): A semiconductor manufacturing device in which the holder of claim 1 is installed.

Claim 14 (original): A liquid-crystal manufacturing device in which the holder of claim 1 is installed.

Claim 15 (currently amended): A holder for semiconductor as well as liquid-crystal manufacturing devices, the holder comprising:

a ceramic susceptor of a ceramic whose thermal conductivity is 100 W/mK or more, said susceptor having a retaining side for retaining an object to be processed;

a resistive heating element incorporated in said susceptor, said resistive heating element patterned in a circuit having a pattern spacing of 0.1 mm or more; and

a metal plate made of one selected from Al-SiC, Cu-W and Cu-Mo to have a thermal conductivity greater than that of said susceptor, said metal plate fastened ~~by bonding, screws, snug fitting, or vacuum adhesion onto to~~ onto said susceptor opposite said retaining side by an adhesive bonding layer, by screws screwed into said susceptor, or by a recess provided in said metal plate, into which said susceptor is snug-fit, for promoting diffusion of heat from said resistive heating element toward said retaining side.

Claim 16 (currently amended): A holder for semiconductor as well as liquid-crystal manufacturing devices, the holder comprising:

a ceramic susceptor of a ceramic whose thermal conductivity is 100 W/mK or more, said susceptor having a retaining side for retaining an object to be processed;

a resistive heating element incorporated in said susceptor and therein present beyond the middle in the thickness direction of said susceptor, toward the side opposite said retaining side, said resistive heating element patterned in a circuit having a pattern spacing of 0.1 mm or more; and

a metal plate made of one selected from Al-SiC, Cu-W and Cu-Mo to have a thermal conductivity greater than that of said susceptor, said metal plate fastened ~~by~~

~~bonding, screws, snug fitting, or vacuum adhesion onto to~~ said susceptor opposite said retaining side by an adhesive bonding layer, by screws screwed into said susceptor, or by a recess provided in said metal plate, into which said susceptor is snug-fit, for promoting diffusion of heat from said resistive heating element toward said retaining side.

REMARKS

Summary of Amendments

Independent claims 1, 15 and 16 have been amended. The rest of the claims remain in their form as submitted in Applicants' reply of March 15, 2006. Accordingly, since claims 5 and 7 have previously been canceled, claims 1-4, 6 and 8-16 are pending.

Claim Rejections – 35 U.S.C. § 103

The present Office action, made final, is almost identical to the first Office action, dated November 11, 2005, in the continued examination of this case. The only differences are that:

- i) the phrase "mechanically attached and bonded to the susceptor" has been inserted into the text of the rejection of claims 1-4, 6 and 9-14 over the Ramanan et al. patent;
- ii) new claims 15 and 16 have been included in repeating the rejection of claim 8, and the reference numeral "(2)" has been added after "metal plate" in the Office's assertion that "Kadomura shows the metal plate"; and
- iii) counterarguments have been presented in the "Response to Arguments" section.

Claims 1, 2, 3, 4, 6 and 9-14: Ramanan et al. '189 in view of Hiramatsu et al. '006 or Ito et al. '116

Claims 1, 2, 3, 4, 6 and 9-14 stand rejected as being unpatentable over U.S. Pat. No. 6,639,189 to Ramanan et al., in view of U.S. Pat. No. 6,507,006 to Hiramatsu et al. or U.S. Pat. No. 6,717,116 to Ito et al.

To better distinguish the present invention over the Ramanan et al. reference in the first place, independent claim 1 has been amended to distinguish by the claimed structure that the metal plate of the present invention promotes diffusion of heat from the susceptor's resistive heating element toward the susceptor's wafer-retaining side, and therefore cannot possibly function as does the cooling member 26 of Ramanan et al.

That is, claim 1 now sets forth a

metal plate mechanically attached to said susceptor opposite said retaining side by an adhesive bonding layer, by screws screwed into

said susceptor, or by a recess provided in said metal plate, into which said susceptor is snug-fit, for promoting diffusion of heat from said resistive heating element toward said retaining side.

It is respectfully submitted that claim 1, in reciting specific structural features that in no wise could be construed as functional operations, now clearly distinguishes over the Ramanan et al. reference, and that because claim 1 should therefore be held allowable, claims 2, 3, 4, 6 and 9-14 should also be held allowable as each depends from claim 1.

Claims 8, and 15 & 16: Ramanan et al. '189 in view of Hiramatsu et al. '006 or Ito et al. '116, and further in view of Kadomura et al. '273

As noted above, claims 15 and 16 have been included in repeating the rejection of claim 8 over, essentially, the Ramanan et al. patent in combination with U.S. Pat. No. 5,968,273 to Kadomura et al.

As Applicants noted in the remarks in reply to the November 11, 2005 Office action,

With respect to claim 8, the Office alleges that Kadomura et al. show a metal plate having "the claimed aluminum silica carbide composite material." Actually, the plates 8a and 8b in Kadomura et al. are mentioned as being made of a metal or metal alloy having a large thermal conductivity, and specifically as being of molybdenum (column 5, lines 45-51 of Kadomura). The *temperature adjusting jacket* in Kadomura et al., on the other hand, is described as being made of a composite aluminum-based material, prepared "by treatment of aluminum or an aluminum alloy with inorganic fibers of alumina, silicon carbide, potassium titanate, aluminum borate or the like under a high pressure" (column 4, lines 7-9).

In response, by inserting (as noted above) the reference numeral "(2)" in the text of the current rejection, the Office has explicitly indicated that the temperature adjusting jacket of Kadomura et al. is deemed to be analogous to the metal plate as recited in claims 8, 15 and 16 of the present application. That is, "a metal plate made of one selected from Al-SiC . . ." as recited in these claims is being alleged to read on Kadomura et al.'s composite aluminum-based material, prepared "by treatment of aluminum with inorganic fibers of silicon carbide."

Claims 15 and 16 have each been amended to recite, commonly, a

metal plate fastened to said susceptor opposite said retaining side by an adhesive bonding layer, by screws screwed into said susceptor, or

by a recess provided in said metal plate, into which said suscepter is snug-fit, for promoting diffusion of heat from said resistive heating element toward said retaining side.

It is respectfully submitted that claims 15 and 16 are patentable over the principal cited references, even in combination with Kadomura et al., because claims 15 and 16 now set forth concrete structural limitations on the claimed metal plate to distinguish the function of the claimed metal plate as being to promote diffusion of heat from the resistive heating element toward the wafer-retaining side, in contradistinction to the temperature adjusting jacket 2 of Kadomura et al.

Meanwhile, it is respectfully submitted that because claim 8 depends from claim 1, claim 8 should be held allowable as including all of the limitations of a base claim allowable for the reasons presented above in addressing the rejection over Ramanan et al. in particular.

Accordingly, Applicant courteously urges that this application is in condition for allowance. Reconsideration and withdrawal of the rejections is requested. Favorable action by the Examiner at an early date is solicited.

Respectfully submitted,

October 31, 2006

/James Judge/

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